

WHAT IS CLAIMED IS:

1. An exposure device comprising:

a light source which emits a light beam for exposure;

a spatial light modulation device at which a plurality of modulation elements, which respectively change light modulation states thereof in accordance with control signals, are two-dimensionally arranged, the spatial light modulation device being for modulating the light beam, which is incident at the plurality of modulation elements from the light source, at each of the modulation elements;

a microlens array at which a plurality of microlenses are two-dimensionally arranged with a pitch corresponding to the plurality of modulation elements, the microlens array being for condensing light beams, which have been modulated by the modulation elements, at the respective microlenses;

a shift amount detection section for detecting an offset amount of relative positions of the light beams which have been modulated by the modulation elements and the corresponding microlenses; and

a position adjustment section which finely adjusts position of at least one of the spatial light modulation device and the microlens array on the basis of the detected offset amount.

2. The exposure device of claim 1, wherein the position adjustment section finely adjusts the position of the at least one of the spatial light modulation device and the microlens array on the basis of the detected offset amount such

that the offset amount is reduced.

3. The exposure device of claim 1, wherein the position adjustment section finely adjusts the position of the at least one of the spatial light modulation device and the microlens array such that the offset amount of the relative positions of the light beams which have been modulated by the modulation elements and the corresponding microlenses, which is detected at the shift amount detection section, is not more than a predetermined value.

4. The exposure device of claim 1, wherein the shift amount detection section comprises: a plurality of light detection elements which correspond, respectively, to a mutually adjacent plurality of the modulation elements; and a calculation section which calculates, on the basis of detection signals from the plurality of light detection elements, the offset amount of the light beams which have been modulated by the modulation elements and the corresponding microlenses.

5. The exposure device of claim 4, wherein the light detection elements comprise photodiodes.

6. The exposure device of claim 1, wherein the shift amount detection section comprises a four-part detector which includes: four photodiodes which correspond, respectively, to four of the modulation elements, which are arranged in a matrix form; and a calculation section which calculates, on the basis of detection signals from the four photodiodes, a row direction offset

amount and a column direction offset amount of the microlenses corresponding to the light beams which have been modulated by the modulation elements.

7. The exposure device of claim 1, wherein the position adjustment section comprises a trimming mechanism which utilizes piezoelectric elements.

8. An exposure device comprising:

a light source which emits a light beam for exposure;

a spatial light modulation device at which a plurality of modulation elements, which respectively change light modulation states thereof in accordance with control signals, are two-dimensionally arranged, the spatial light modulation device being for modulating the light beam, which is incident at the plurality of modulation elements from the light source, at each of the modulation elements;

a microlens array at which a plurality of microlenses are two-dimensionally arranged with a pitch corresponding to the plurality of modulation elements, the microlens array being for condensing light beams, which have been modulated by the modulation elements, at the respective microlenses;

a focusing optical system including at least one optical member, the focusing optical system being for focusing the light beams which have been modulated by the modulation elements so as to correspond to the microlenses;

a shift amount detection section which detects an offset amount of relative positions of the light beams which have been modulated by the modulation elements and the corresponding microlenses; and

a position adjustment section which finely adjusts position of at least one of the spatial light modulation device, the microlens array and the optical member on the basis of the detected offset amount.

9. The exposure device of claim 8, wherein the position adjustment section finely adjusts the position of the at least one of the spatial light modulation device, the microlens array and the optical member on the basis of the detected offset amount such that the offset amount is reduced.

10. The exposure device of claim 8, wherein the position adjustment section finely adjusts the position of the at least one of the spatial light modulation device, the microlens array and the optical member such that the offset amount of the relative positions of the light beams which have been modulated by the modulation elements and the corresponding microlenses, which is detected at the shift amount detection section, is not more than a predetermined value.

11. The exposure device of claim 8, wherein the shift amount detection section comprises: a plurality of light detection elements which correspond, respectively, to a mutually adjacent plurality of the modulation elements; and a calculation section which calculates, on the basis of detection signals from the plurality of light detection elements, the offset amount of the light beams which have been modulated by the modulation elements and the corresponding microlenses.

12. The exposure device of claim 11, wherein the light detection elements

comprise photodiodes.

13. The exposure device of claim 8, wherein the shift amount detection section comprises a four-part detector which includes: four photodiodes which correspond, respectively, to four of the modulation elements, which are arranged in a matrix form; and a calculation section which calculates, on the basis of detection signals from the four photodiodes, a row direction offset amount and a column direction offset amount of the microlenses corresponding to the light beams which have been modulated by the modulation elements.

14. The exposure device of claim 8, wherein the position adjustment section comprises a trimming mechanism which utilizes piezoelectric elements.

15. An exposure device comprising:

- a light source which emits a light beam;

- a spatial light modulation device including a plurality of unit elements which are arranged two-dimensionally, the spatial light modulation device being for modulating the light beam, which is incident at the plurality of unit elements, at each of the unit elements in accordance with control signals which are inputted to the spatial light modulation device;

- a microlens array including microlenses which are arranged to correspond to the plurality of unit elements and which respectively condense light beams, which have been modulated by the unit elements;

- a displacement detection section for detecting displacement of a relative position of at least one of the plurality of unit elements and at least one of the

plurality of microlenses corresponding to the at least one unit element from a predetermined relative position; and

a position adjustment section which finely adjusts position of at least one of the spatial light modulation device and the microlens array on the basis of the detected displacement.

16. The exposure device of claim 15, wherein the displacement detection section detects the displacement by detecting light beams that have been modulated by, of the plurality of unit elements, at least two neighboring unit elements and have passed through the microlenses that correspond to those unit elements, and comparing outputs of detected light beams.

17. The exposure device of claim 15, wherein the displacement detection section detects displacement of a relative position of a light beam that has been modulated by at least one of the plurality of unit elements and at least one of the plurality of microlenses corresponding to the at least one unit element from a predetermined relative position.

18. The exposure device of claim 15, wherein the position adjustment section comprises a trimming mechanism which utilizes piezoelectric elements.

19. The exposure device of claim 15, wherein the plurality of unit elements respectively include micromirrors which change angles of reflection surfaces thereof with respect to the incident light beam in accordance with the control signals which are inputted to the spatial light modulation device.